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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,246	10/28/2003	Joerg Bischoff	509982005700	7040
20872	7590	04/06/2005	EXAMINER	
MORRISON & FOERSTER LLP 425 MARKET STREET SAN FRANCISCO, CA 94105-2482			NGUYEN, SANG H	
			ART UNIT	PAPER NUMBER

2877

DATE MAILED: 04/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/696,246	Applicant(s) BISCHOFF ET AL.	
	Examiner Sang Nguyen	Art Unit 2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,10,13,14,22 and 25 is/are rejected.
- 7) ☒ Claim(s) 3-9, 11-12, 15-21, and 22-23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

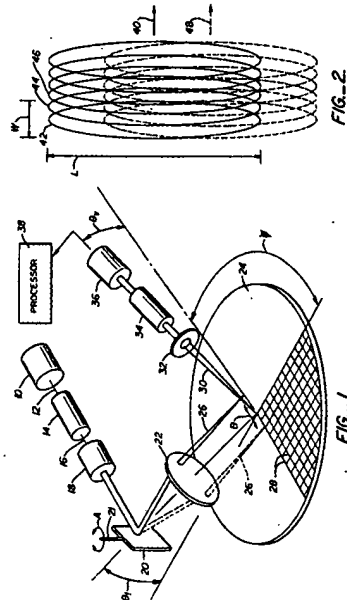
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Stonestrom et al (U.S. Patent No. 4,898,471).

Regarding claims 1 and 13; Stonestrom et al discloses a system and method for examining a three dimensional structure formed on the semiconductor wafer, comprising:

- a laser source (10 of figure 1) for directing an incidence beam (26 of figure 1) to the structure considered to be a periodic pattern formed thereon a plurality of die with rectangular grid of street between die (28 of figure 1 and col.4 lines 34-36) of the semiconductor wafer (24 of figure 1) at an incidence angle (θ_i of figure 1) and an azimuth angle (Ψ of figure 1), wherein the incident beam (26 of figure 1) is scanned over a range of azimuth angles by to obtain an azimuthal scan (col.3 lines 50-51 and col.5 lines 7-35 and figure 2); and
- a detector (36 of figure 1 or 96 of figure 6A) for detecting the cross polarization components (34 of figure 1) of diffracted beams (89 of figure 6A) during the azimuthal scan. See figures 1-7B.

U.S. Patent Feb. 6, 1990 Sheet 1 of 4 4,898,471



Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stonestrom et al (U.S. Patent No. 4,898,471) in view of Hayashi (U.S. Patent No. 4837603).

Regarding claims 2 and 14; Stonestrom et al discloses all of features of claimed invention as indicate polarized of the incident beam (26 of figure 1) has angle at polarization angle of 5 degrees or 20 degrees (col.4 lines 24-30) except for the incident beam is polarized at a polarization angle of zero or 90 degrees. However, Hayashi teaches that it is known in the art to provide a correction azimuth angle of the photometric ellipsometers comprising the incident beam is polarized at a polarization angle of zero or 90 degrees by a polarizer (2 of figure 1) and analyzer (4 of figure 1 and col.2 lines 45-46) . It would have been obvious to one having ordinary skill in the art at the time the invention was made modify a system and method for examining a three dimensional structure formed on the semiconductor wafer of Stonestrom et al with the incident beam is polarized at a polarization angle of zero or 90 degrees as taught by Hayashi for the purpose of correcting or canceling the errors in the azimuth angle by measured higher accuracy with ellipsometric parameters.

Claims 10, 22, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stonestrom et al (U.S. Patent No. 4,898,471)in view of Sezginer et al (U.S. Patent No. 6,819,426).

Regarding claims 10, 22, and 25; Stonestrom et al discloses all of features of claimed invention as **indicated in claims 1 and 13**, except for the rotation of the structure is determined based on the azimuthal scan. However, Sezginer et al teaches that it is known in the art to provide the rotation of the structure (32 of figure 4) of the test pattern (10 of figure 4) is determined based on the azimuthal scan (col.9 lines 55-60 and col.18 lines 7-26). It would have been obvious to one having ordinary skill in the art at the time the invention was made modify a system and method for examining a three dimensional structure formed on the semiconductor wafer of Stonestrom et al with the rotation of the structure is determined based on the azimuthal scan as taught by Sezginer et al for the purpose of controlling accurately the azimuth angle to reduce sensitivity parameters other than overlay error.

Allowable Subject Matter

Claims 3-9, 11-12, 15-21, and 23-24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of record, taken alone or in combination, fails discloses or render obvious a method and system for examining a three dimensional structure formed on a semiconductor comprising all the specific elements with the specific combination including of a zero azimuth position is determined based on the azimuthal scan, wherein the cross polarization components are zero at the zero azimuth position in set forth limitation of claims 3 and 15.

The prior art of record, taken alone or in combination, fails discloses or render obvious a method and system for examining a three dimensional structure formed on a semiconductor comprising all the specific elements with the specific combination including of detecting azimuthal misalignment of the measured diffraction signal to a simulated diffraction signal based on the determined zero azimuth position in set forth limitation of claims 5 and 17.

The prior art of record, taken alone or in combination, fails discloses or render obvious a method and system for examining a three dimensional structure formed on a semiconductor comprising all the specific elements with the specific combination including of the three dimensional structure is a contact hole array, wherein a contact hole array is determined to be asymmetric based on the azimuthal scan in set forth limitation of claims 7 and 19.

The prior art of record, taken alone or in combination, fails discloses or render obvious a method and system for examining a three dimensional structure formed on a semiconductor comprising all the specific elements with the specific combination including of the rotation of the structure is determined when the cross polarization reach a minimum but are not zero and the cross polarization terms are not symmetric about the minimum in set forth limitation of claims 11 and 23.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bao et al (6609086) discloses profile refinement for integrated circuit metrology; Vaez-Iravani et al (6538730) discloses defect detection system; Singh

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et al (6448097) discloses measure fluorescence from chemical released during trim etch; Michaelis et al (6031614) discloses measurement system and method; Rosengaus et al (6020957) discloses system and method for inspecting semiconductor wafers; Nikoonahad et al (5883,710) discloses scanning system for inspecting anomalies on surfaces; Neukermans et al (5076692) discloses particle detection on a patterned or bare wafer surface; Canino (4672196) discloses method and apparatus for measuring properties of thin materials using polarized light; Matthews et al (4606645) discloses method for determining localized fiber angle in the three dimensional; or Diepeveen (4516159) discloses elevation step scanner.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sang Nguyen whose telephone number is (571) 272-2425. The examiner can normally be reached on 9:30 am to 7:00 pm.

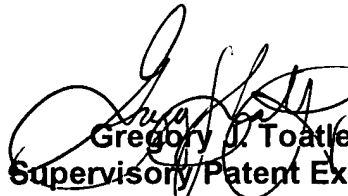
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Sang Nguyen

March 31, 2005



Gregory D. Toatley, Jr.
Supervisory Patent Examiner
Art Unit 2877
Technology Center 2800

